

Table of Contents

Solid Waste and Recycling Curriculum

Curriculum--Contact List	I-5
Curriculum--Credits	I-6
Curriculum--Statement of Purpose	I-7
Curriculum--Master Materials List	I-9
Curriculum--Nevada Standard Alignment	I-11
Curriculum--References	I-15
MODULE 1 – MY GARBAGE	
Module 1--Table of Contents	M1-1
Module 1--Master Materials List	M1-1m
Module 1--Nevada Standard Alignment	M1-1s
Module 1--References	M1-1r
Lesson 1 – Just a Dream <i>Environmental Intro Using Van Allsburg's <u>Just A Dream</u></i>	M1-3
Lesson 2 – It's the Old Style <i>Landfill-Municipal Solid Waste</i>	M1-13
Lesson 3 – My Landfill is Sanitary <i>Landfill-Municipal Solid Waste</i>	M1-45

Lesson 4 – How Long Does Trash Last? <i>Waste Decomposition</i>	M1-71
Lesson 5 – Potato Chip Dilemma <i>Reduce</i>	M1-89
Lesson 6 – Play It Again, Sam <i>Re-use</i>	M1-105
Lesson 7 – Warhol Waste <i>Art Project/Assessment: Collage</i>	M1-121
Lesson 8 – Warhol Waste <i>Art Project/Assessment: Collage</i>	M1-135
MODULE 2 – It’s Organic, Man!	
Module 2--Table of Contents	M2-1
Module 2--Master Materials List	M2-1m
Module 2--Nevada Standard Alignment	M2-1s
Module 2--References	M2-1r
Lesson 9 – Breakin’ it Down <i>Waste Characterization/Composting</i>	M2-3
Lesson 10 – My Carrots Are Green <i>Composting</i>	M2-25
Lesson 11 – The Worms Ate My Homework <i>Vermicomposting</i>	M2-53
Lesson 12 – It’s My Paper, and I Like It <i>Papermaking</i>	M2-69
Lesson 13 – Thoreau Think Piece <i>Writing Assessment: RAFT</i>	M2-87
Lesson 14 – Thoreau Think Piece <i>Writing Assessment: RAFT</i>	M2-97

MODULE 3 – Industrial Strength

Module 3--Table of Contents	M3-1m
Module 3--Master Materials List	M3-1m
Module 3--Nevada Standard Alignment	M3-1s
Module 3--References	M3-1r
Lesson 15 – Pulp Non-Fiction <i>Industrial Paper Recycling</i>	M3-3
Lesson 16 – Solid Steel <i>Aluminum and Steel Recycling</i>	M3-19
Lesson 17 – Recycle, For PETE’s Sake <i>Plastic Recycling</i>	M3-31
Lesson 18 – 2800 Degrees Fahrenheit <i>Glass Recycling</i> <i>(and Mercury exposure)</i>	M3-53
Lesson 19 – Socrates Static <i>Oral Assessment: Debate</i>	M3-79
Lesson 20 – Socrates Static <i>Oral Assessment: Debate</i>	M3-99

This page was intentionally left blank.



Contact List

Solid Waste and Recycling Curriculum

Chester Sergent

Northern Nevada Recycling Coordinator
Bureau of Waste Management
Nevada Division of Environmental Protection
901 S. Stewart St., Ste 4001
Carson City NV 89701
p: 775.687.9466 f: 775.687.5856
e: csergent@ndep.nv.gov

Kathryn Fergus

Southern Nevada Recycling Coordinator
Bureau of Waste Management
Nevada Division of Environmental Protection
2030 E. Flamingo Ave., Ste 230
Las Vegas, NV 89119
p: 702.486.2850 X 251 f: 702.486-2863
e: kfergus@ndep.nv.gov



Credits

Solid Waste and Recycling Curriculum

The compilation of lessons contained in the following pages is the result of the continued dedication of the Nevada Division of Environmental Protection, members of the educational community, and those in Nevada dedicated to the promotion of recycling efforts.

Thanks to Bonnie Serpa, Connie Bland, Kathy Garman, Anamarie Lopetegui, Jenna Larkin, Shannon Hastings, and Blair Bailey for allowing the NDEP to teach and refine the curriculum in their classrooms.

Special thanks to Alyssa Kirch, Bonnie Serpa, Shannon Hastings, Cindy Sharp, John Sagebiel, Tera Pike, Jennifer Jacobi, and Tricia Mynster for reviewing the initial edition of the Solid Waste and Recycling Curriculum. We believe the changes made based on your suggestions vastly improved this work.

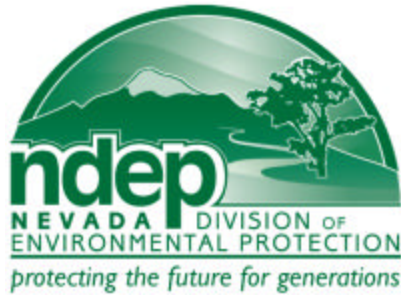
The following members of NDEP played a key part in bringing this project to its current form: Michael Keith, Kathryn Fergus, Chet Sergeant, Ed Glick, Eric Noak, and Diane Benson.

Any omission of persons who played a role in the development of the curriculum is accidental.

We hope the Solid Waste and Recycling Curriculum can meet the needs of your classroom. Feel free to contact us at any time if you have questions or comments.

Thank you,

Michael Keith
Recycling Education and Outreach
Bureau of Waste Management
Nevada Division of Environmental Protection



Statement of Purpose

Solid Waste and Recycling Curriculum

The Nevada Division of Environmental Protection's Solid Waste & Recycling Branch has put this series of lessons together to help satisfy the requirements of NRS 444A.110. The statute states that the NDEP, "...shall develop a program of public education to provide information, increase public awareness of the individual responsibility of properly disposing of solid waste and encouraging public participation in recycling, reuse, and waste reduction."

The goal of this curriculum is to promote a sense of environmental stewardship and responsibility among school aged children. The NDEP believes an effective way to achieve this goal is through providing an interactive curriculum, rather than individual presentations, designed for the public and private school systems.

The Solid Waste and Recycling Curriculum is organized into three distinct modules:

Module #1 – Waste Management

Module #2 – Organic Recycling

Module #3 – Industrial Recycling

with assessment lessons incorporated into the framework of each module. The modules may be used individually, or together as an integrated teaching unit. In total, the curriculum is comprised of 20 lessons at 2 lessons per week, or 10-weeks duration.

The lessons included in the curriculum are based on the 5th grade science standards in the State of Nevada. As with any elementary school program, the lessons will include elements from other disciplines (i.e. math, geography, language arts).

This page was intentionally left blank.



Master Materials List

Solid Waste and Recycling Curriculum

Student workbooks are used for every lesson. In nearly every lesson the white board and dry erase markers are used. Should you be inclined, transparencies can be made and used on an overhead projector with water based markers.

1	<u>Just a Dream</u> by Chris Van Allsburg
1	<u>The Dumpster Diver</u> by Janet S. Wong
1	<u>Diary of a Worm</u> by Doreen Cronin
21	2L plastic soda bottles (the same bottles can be re-used for lessons 2,3 & 10) Remove the labels.
1	X-Acto knife
3	Pair nylon hose
30	Permanent marker
35	Cotton balls
21	Cups shredded paper
35	Cups soil
28	Rubber bands
21	Cups water
1	Measuring cup
7	Reusable grocery bags
220	One gallon Zip-Lock bags (many of these can be re-used)
7	Cups small aquarium gravel
1	Large block of modeling clay
1	Plastic trash bag
2	Square feet nylon deck shade fabric (geotextile fabric)
7	Plastic drinking straws
1	Roll paper towels
2	Large measuring bowls
1	Large bag potato chips (20oz)
20	Small bags potato chips (equal weight to the large bag)
10	Sandwich sized Zip-Lock baggies
10	Plastic reusable food containers
60	Sheets printer/copy paper
30	Sets colored pencils / crayons
30	Magazines
30	Sheets 11 X 17 paper

Student workbooks are used for every lesson. In nearly every lesson the white board and dry erase markers are used. Should you be inclined, transparencies can be made and used on an overhead projector with water based markers.

30	Glue sticks
30	Scissors (student)
1	Pair scissors (adult)
17.5	Cups small kitchen waste
3.5	Cups dried leaves
3.5	Cups pencil shavings (or sawdust)
7	TBLs compost starter
7	Mixing bowls
1	Container of 2lbs of red wigglers (or vermicomposting bin)
30	Magnifying glasses
4	Newspapers
7	2 quart buckets
30	6in X 6in drywall patches
30	Sponges
7	Hand held strainers
7	Potato mashers
1	Roll waxed paper
1	5 gallon bucket
1	Cross cut shredder
7	Plastic 1 gallon storage containers
14	Pieces of butcher paper or newsprint: 3ft X 3ft
1	Aluminum can
1	Steel can



Nevada Standard Alignment

Lesson	Title	Topic	<u>Nevada</u> Science	<u>Nevada</u> Language Arts	<u>Nevada</u> Geography	<u>Nevada</u> Mathematics
1	Just a Dream	Introduction	N.5.B.2	2.5.1, 2.5.2, 2.5.3, 3.5.9, 7.5.1, 7.5.2, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 5.5.1, 5.5.3, 5.5.4, 6.5.4	n/a
2	It's the Old Style	Landfills	N.5.A.6, N.5.B.2, E.5.A.4, E.5.C.3, E.5.C.5, L.5.C.2, L.5.C.3, L.5.C.4	7.5.1, 7.5.2, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 3.5.3, 3.5.5, 5.5.1, 5.5.3, 5.5.4, 6.5.4	1.5.8, 3.5.1
3	My Landfill is Sanitary	Landfills – Sanitary	N.5.A.6, N.5.B.2, E.5.A.4, E.5.C.3, E.5.C.5, L.5.C.2, L.5.C.3, L.5.C.4	7.5.1, 7.5.2, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 3.5.3, 3.5.5, 5.5.1, 5.5.3, 5.5.4, 6.5.4	n/a
4	How Long Does Trash Last?	Waste Decomposition	N.5.A, N.5.A.1, N.5.A.2, N.5.A.3, N.5.B.2, N.5.B.3, L.5.C.2, L.5.C.3, L.5.C.4	7.5.1, 7.5.2, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 3.5.3, 3.5.5, 5.5.1, 5.5.3, 5.5.4, 6.5.4	5.5.1
5	Potato Chip Dilemma	Waste Reduction	N.5.A.3, N.5.B.2, L.5.C.3	7.5.1, 7.5.2, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 4.5.6, 5.5.1, 5.5.3, 5.5.4, 6.5.4	n/a
6	Play It Again, Sam	Material Re-Use	N.5.B.2	4.5.7, 5.5.1, 5.5.3, 5.5.4, 5.5.5, 5.5.7, 6.5.7, 7.5.1, 7.5.2, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 4.5.6	n/a
7	Warhol Waste	Assessment	Assessment	Assessment	Assessment	Assessment
8	Warhol Waste (part 2)	Assessment	Assessment	Assessment	Assessment	Assessment



Nevada Standard Alignment

Lesson	Title	Topic	<u>Nevada</u> Science	<u>Nevada</u> Language Arts	<u>Nevada</u> Geography	<u>Nevada</u> Mathematics
9	Breakin' It Down	Waste Characterization / Compost	N.5.A.1, N.5.A.4, N.5.B.2, E.5.A.4, E.5.A.5, E.5.C.3, P.5.A.4, P.5.A.6, L.5.C.2, L.5.C.3, L.5.C.4	7.5.1, 7.5.2, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 3.5.3, 5.5.1, 5.5.4, 6.5.4	5.5.1, 5.5.6
10	My Carrots Are Green	Compost	N.5.A.6, N.5.B.2, E.5.A.4, E.5.A.5, P.5.A.4, P.5.A.6, L.5.C.2, L.5.C.3, L.5.C.4	7.5.1, 7.5.2, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 3.5.3, 5.5.1, 5.5.4, 6.5.4	n/a
11	The Worms Ate My Homework	Vermicompost	N.5.A.1, N.5.B.2, E.5.A.4, E.5.A.5, P.5.A.4, P.5.A.6, L.5.A.1, L.5.A.2, L.5.C.2, L.5.C.3, L.5.C.4	7.5.1, 7.5.2, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 3.5.3, 5.5.1, 5.5.4, 6.5.4	n/a
12	It's My Paper, and I Like It	Paper Making	N.5.A.6, N.5.B.2	7.5.1, 7.5.2, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 4.5.6, 6.5.4	n/a
13	Thoreau Think Piece	Assessment	Assessment	Assessment	Assessment	Assessment
14	Thoreau Think Piece (part 2)	Assessment	Assessment	Assessment	Assessment	Assessment



Nevada Standard Alignment

Lesson	Title	Topic	<u>Nevada</u> Science	<u>Nevada</u> Language Arts	<u>Nevada</u> Geography	<u>Nevada</u> Mathematics
15	Pulp Non-Fiction	Industrial Paper Recycling	N.5.B.2, P.5.A.3, L.5.C.4	1.5.4, 2.5.1, 2.5.2, 2.5.3, 4.5.1, 4.5.5, 5.5.1, 5.5.5, 5.5.7, 6.5.7, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 5.5.1, 5.5.4, 6.5.4	n/a
16	Solid Steel	Aluminum and Steel Recycling	N.5.B.2, P.5.A.3, P.5.A.4, P.5.B.3, L.5.C.4	5.5.1, 5.5.3, 5.5.5, 6.5.3, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 5.5.1, 5.5.4, 6.5.4	n/a
17	Recycle For PETE's Sake	Plastic Recycling	N.5.B.2, P.5.A.3, P.5.A.4, L.5.C.4	7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 5.5.1, 5.5.4, 6.5.4	n/a
18	2800 Degrees Fahrenheit	Glass Recycling (and Mercury exposure)	N.5.B.2, P.5.A.3, P.5.A.4, L.5.C.4	1.5.4, 2.5.1, 2.5.2, 2.5.3, 4.5.1, 4.5.5, 5.5.1, 7.5.3, 7.5.5, 8.5.1, 8.5.2, 8.5.4	2.5.4, 5.5.1, 5.5.4, 6.5.4	n/a
19	Socrates Static	Assessment	Assessment	Assessment	Assessment	Assessment
20	Socrates Static (part 2)	Assessment	Assessment	Assessment	Assessment	Assessment



Module 1

MY GARBAGE

References

Lesson 1 – Just a Dream

Van Allsburg, Chris. (1990). *Just a Dream*. New York: Houghton Mifflin.

Houghton Mifflin Company. (2008). *A Teacher's Guide: Just a Dream by Chris Van Allsburg*. Retrieved April 9, 2008, from <http://www.houghtonmifflinbooks.com/features/thepolarexpress/tg/dream.shtml>

White, Marilyn. (2008). "We have met the enemy... and he is us.". Retrieved April 9, 2008, from http://www.igopogo.com/we_have_met.htm

Lesson 2 – It's the Old Style

Nevada Division of Environmental Protection. (2007). *State of Nevada Solid Waste Management Plan 2007*. Retrieved May 28, 2008 from <http://ndep.nv.gov/bwm/swmp/swp06.htm#sec2.5>

The Nevada State Demographer's Office. (2007). *Nevada County Population Estimates July 1, 1986 to July 1, 2007 Includes Cities and Towns*. Retrieved May 28, 2008 from http://www.nsbdc.org/what/data_statistics/demographer/pubs/docs/Popul_of_Nevadas_Counties_and_Incorp_cities_2007_Time_Series_Email_021508.pdf

Oregon Department of Environmental Quality. (2001). *Lesson 05: Making A Model Landfill*. Retrieved May 28, 2008 from <http://www.deq.state.or.us/lq/pubs/docs/sw/curriculum/RRPart0305.pdf>

United States Environmental Protection Agency. (2003). *Recycle City: Landfill*. Retrieved May 28, 2008 from <http://www.epa.gov/recyclecity/landfill.htm#New>

Lesson 3 – My Landfill is Sanitary

Oregon Department of Environmental Quality. (2001). *Lesson 05: Making A Model Landfill*. Retrieved May 28, 2008 from <http://www.deq.state.or.us/lq/pubs/docs/sw/curriculum/RRPart0305.pdf>

United States Environmental Protection Agency. (2003). *Recycle City: Landfill*. Retrieved May 28, 2008 from <http://www.epa.gov/recyclecity/landfill.htm#New>

Lesson 4 – How Long Does Trash Last?

Hopkins, Gary. (2003). *How Long Does Trash Last? (A Cooperative Learning Activity)*. Retrieved April 8, 2008 from http://www.educationworld.com/a_lesson/03/lp308-04.shtml

Rathje, W. L., & Murphy, C. (1992). *Rubbish!: the archaeology of garbage*. New York, NY: HarperCollins.

Lesson 5 – Potato Chip Dilemma

American Plastics Council. (1993). *The Potato Chip Dilemma: A Lesson About Source Reduction. 4 Classroom Activities on Plastics and Solid Waste Management*. 11-13.

Lesson 6 – Play It Again, Sam

Wong, Janet S. (2007). *The Dumpster Diver*. Cambridge: Candlewick.

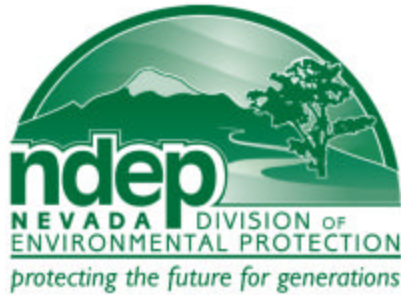
Candlewick Press. (2007). *The Dumpster Diver: An Activity Guide*. Retrieved April 9, 2008, from http://www.candlewick.com/book_files/0763623806.mis.1.pdf

Lesson 7 – Warhol Waste

No works referenced for this lesson.

Lesson 8 – Warhol Waste

Discovery Education. (2007). *Discovery Education's Puzzlemaker*. Retrieved May 29, 2008 from <http://puzzlemaker.discoveryeducation.com/>



Module 2

It's Organic, Man!

References

Lesson 9 – Breakin’ it Down

United States Environmental Protection Agency. (2006). *Municipal Solid Waste in the United States: 2005 Facts and Figures (EPA530-R-06-011)*.

United States Environmental Protection Agency. (2007). *Composting: Basic Information*. Retrieved June 2, 2008 from <http://www.epa.gov/epaoswer/non-hw/composting/basic.htm>

Lesson 10 – My Carrots Are Green

Freudenrich, Ph.D., Craig. (2001). *How Composting Works*. Retrieved June 3, 2008 from <http://home.howstuffworks.com/composting.htm>

Lesson 11 – The Worms Ate My Homework

Cronin, Doreen. (2003). *Diary of a Worm*. New York: HarperCollins.

New York State Department of Environmental Conservation. (2006). *“RW” Goes to School: A Teachers Guide*. Albany, NY: New York State Department of Environmental Conservation.

Lesson 12 – It’s My Paper, and I Like It

Technical Association of the Pulp and Paper Industry. (2001). *Making Paper by Hand*. Retrieved June 3, 2008 from http://www.tappi.org/paperu/art_class/makingPaper.htm

Lesson 13 – Thoreau Think Piece

Thoreau, Henry David. (1910). *Walden*. New York: C.E. Merrill Co.

Lesson 14 – Thoreau Think Piece

Discovery Education. (2007). *Discovery Education’s Puzzlemaker*. Retrieved May 29, 2008 from <http://puzzlemaker.discoveryeducation.com/>

Thoreau, Henry David. (1910). *Walden*. New York: C.E. Merrill Co.



Module 3

Industrial Strength

References

Lesson 15 – Pulp Non-Fiction

United States Environmental Protection Agency. (2006). *Municipal Solid Waste in the United States: 2005 Facts and Figures* (EPA530-R-06-011).

TAPPI. (2001). *How is Paper Recycled?*. Retrieved June 4, 2008 from http://www.tappi.org/paperu/all_about_paper/earth_answers/earthAnswers_Recycle.pdf

Lesson 16 – Solid Steel

United States Environmental Protection Agency. (2006). *Municipal Solid Waste in the United States: 2005 Facts and Figures* (EPA530-R-06-011).

Oregon Department of Environmental Quality. (2001). *Lesson 15: All About Aluminum*. Retrieved May 28, 2008 from <http://www.deq.state.or.us/lq/pubs/docs/sw/curriculum/RRPart0315.pdf>

Lesson 17 – Recycle, For PETE's Sake

United States Environmental Protection Agency. (2006). *Municipal Solid Waste in the United States: 2005 Facts and Figures* (EPA530-R-06-011).

American Chemistry Council. (2007). *Plastic Packaging Resins*. Retrieved May 28, 2008 from http://www.americanchemistry.com/s_plastics/bin.asp?CID=1102&DID=4645&DOC=FILE.PDF

Lesson 18 – **2800 Degrees Fahrenheit**

United States Environmental Protection Agency. (2006). *Municipal Solid Waste in the United States: 2005 Facts and Figures (EPA530-R-06-011)*.

Glass Packaging Institute. (2005). *FAQ'S*. Retrieved May 28, 2008 from <http://www.gpi.org/recycling/faq/>

Nevada Division of Environmental Protection. (2005). *What You Need to Know About Mercury*. [Brochure]. Carson City, NV: Author.

Lesson 19 – **Socrates Static**

static. (2008). In *Merriam-Webster Online Dictionary*. Retrieved June 5, 2008, from <http://www.merriam-webster.com/dictionary/static>

Lesson 20 – **Socrates Static**

No works referenced for this lesson.